WOOD & GRIEVE ENGINEERS

# Cowle St, West Perth - Multiple Dwelling Apartments

## Sustainability Services
## NCC Section J NatHERS Report
## Cost Plan 1 Issue

Prepared for:

**Dean Burrowes**
The Match Group

**Date:**
22 August 2016

Prepared by:

**Alex Murphy**
Project No. 29398
\\WGE-PER-FS-01\PROJECTS\29398\PROJECT DOCUMENTATION\SUSTAINABILITY\SECTION J\29398_G_NATHERS_COWLE ST_REV 2.DOCX

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# Revision

| REVISION | DATE | COMMENT | APPROVED BY |
|---|---|---|---|
| **0** | 21/03/2016 | Preliminary Issue | **PC** |
| **1** | 23/05/2016 | Cost Plan 1 Issue | **PC** |
| **2** | 22/08/2016 | Results split between Site 1 & 2 | **PC** |
| | | | |
| | | | |

## Qualifications to this Report

The following qualifications apply to this report:

- Information has been based on our understanding of the proposed building and documentation provided, as noted. Architect to review & confirm any assumptions where required.
- This report outlines the scope of works required for NCC Section J compliance only.
  The project design team (including the Architect) will be required to review and consider the implications of these recommendations on their design for the project.
  For example:
  - Glazing selections have considered the thermal rating to the glazing and frame configurations only. The design team should also coordinate these recommendations with any specific acoustic, wind, structural, safety (during design and installation) or Architectural Design requirements for a particular project.
  - Different insulation products will have varying spatial allowances. The design team should coordinate the proposed insulation types, with specified R-values required throughout this report.
- As this project involves no detailed design or site supervision by Wood & Grieve Engineers, we advise that we will not prepare a Safety in Design report for this project. As detailed in our scope of work we will review the Safety in Design report prepared by the project designer and make comment as appropriate. We confirm that the responsibility for complying with the requirements of the state OS&H legislation remains with the project designer in conjunction with the project team and the client. We note that the OS&H legislation places particular obligations on the developers and owners of property with respect to the management of OS&H issues arising from the construction, use, maintenance and demolition of plant and buildings.

### Disclaimer

This energy model provides an estimate of the base building's energy performance. This estimate is based on a necessarily simplified and idealised version of the building that does not and cannot fully represent all of the intricacies of the building and its operation. As a result, the energy model results only represent an interpretation of the potential performance of the building. No guarantee or warrantee of building performance in practice can be based on energy modelling results alone.

The results generated from this analysis are based on specific criteria outlined in the NCC Volume One and are not considered to be a true representation of the actual operation of the building. The intent of these criteria is to permit the comparison of the estimated annual energy consumption of a Proposed Building against that of a Reference Building and therefore determine if a specific building has the ability to be energy efficient.

The thermal properties described in the following report are to meet the minimum energy efficiency requirements stated by the NCC provisions only. It does not directly account for any requirements for the following aspects:

- Thermal Comfort – Mechanical engineer to confirm any specific requirements for Air-Conditioning Systems
- Vapour Barriers and Condensation – Architect to ensure appropriate details for waterproofing and condensation risk management
- Impact and Structural – Structural engineer to confirm requirements
- Acoustic requirements – Acoustic engineer to confirm requirements
- Fire Requirements - Fire Engineer or Building Surveyor to confirm requirements.

# Contents

# 1. Executive Summary

This report has been prepared at the instruction of Cameron Chisholm Nicol and is intended to assess the energy efficiency of the residential portion under the NCC (2015) Energy Efficiency Requirements. To meet BCA compliance, the dwellings are required to attain a 6 Star average NatHERS rating across the development with each independent dwelling to achieve a minimum of 5 Stars. The NatHERS assessments are summarised in Table 1 below.

**Table 1: Average and minimum energy efficiency ratings**

| SITE | AVERAGE ENERGY INTENSITY ($MJ/m^2$) | AVERAGE STAR RATING | MINIMUM STAR RATING |
|---|---|---|---|
| **1** | 29.8 | 6.7 | 5.2 |
| **2** | 29.1 | 6.7 | 5.0 |

The above results confirm the development meets NCC (2015) Section J Energy Efficiency Requirements. It can be confirmed that the residential portion of the project complies with the NCC Section J requirements with the building fabric assumptions shown in Table 2 below.

**Table 2: Building fabric assumptions**

| *Type* | *Assumption* |
|---|---|
| **External Walls** | Material = Lightweight cavity panel wider than 70mm<br>Insulation = **R2.0** to be added |
| **Party and Internal Corridor Walls** | Material = 200mm Tilt Up Concrete, Lined<br>Insulation = None to be added |
| **Roof and where exposed above** | Material = Corrugated iron with solar absorptance 0.8.<br>Insulation = **R1.8** anticon to be added |
| **Ceiling between Apartments** | *Apartment: U2-307*<br>Material = Plasterboard<br>Insulation = **R0.5** to be added<br>*All others:*<br>Material = Plasterboard<br>Insulation = No insulation required |
| **Floors between Apartments** | Material = Suspended Concrete Slab<br>Insulation = No insulation required |
| **Floor above Carpark & Unconditioned Spaces** | Material = Suspended Concrete Slab<br>Insulation = **R2.0** to be added |
| **Glazing (Standard Apartments)** | *Apartments: U2-307, U2-308, U1-308*<br>Whole of Window Properties, i.e. combined glass and frame **U-Value = 5.4 W/m²K** and **Solar Heat Gain Coefficient = 0.48**<br>Typically a ***Single Glazed, Low-E Clear in Aluminium Frame (e.g. Viridian ComfortPlus Clear)***<br><br>*All others:*<br>Whole of Window Properties, i.e. combined glass and frame **U-Value = 6.7 W/m²K** and **Solar Heat Gain Coefficient = 0.70**<br>Typically a ***Single Glazed, Clear in Aluminium Frame*** |

# 2. Introduction

This report has been prepared at the instruction of Cameron Chisholm Nicol and is intended to:

- Assess the energy efficiency of the residential apartments under the NCC (2015) Energy Efficiency Requirements.

Based on the documentation received, Wood and Grieve Engineers have carried out a review of the project against the following NCC 2015 Section J requirements:

- Part J1 Building Fabric Design;
- Part J2 Glazing; and
- Part J3 Building Sealing

*We note that Parts J5, J6, J7 & J8 will be covered by Electrical, Mechanical and Hydraulics Services Design team.

For the State of WA BCA part J0.2 is applicable and requires residential dwellings to meet the following requirements:

**J0.2 Heating and cooling loads of sole-occupancy units of a Class 2 building or a Class 4 part**

The sole-occupancy units of a Class 2 building or a Class 4 part of a building must—

(a) for reducing the heating or cooling loads—

(i) collectively achieve an average energy rating of not less than 6 stars; and

(ii) individually achieve an energy rating of not less than 5 stars,

using house energy rating software;

The house energy rating software applied for this assessment is First Rate 5.

Where further feedback or clarification is required, these items are noted in ***bold italic*** text.

## 2.1 Building Summary

The proposed development can be summarised as follows:

- Basement Level – Apartment storage, car stacker pits and rain water storage.
- Ground Level – Apartments, landscaping and bin stores.
- Level 1 to 3 – Apartments and external corridors.

Total Residential Units – 74

The information contained in this report has been based on the following information:

- Architectural Drawings (Development Approval Issue) dated 12/05/2016

# 3. Modelling Assumptions

The table below describes the assumptions made for the building fabric and other modelling variables.

**Table 3: Building Fabric Assumptions**

| *Type* | *Assumption* | *Comment* |
|---|---|---|
| **External Walls** | Material = Lightweight cavity panel wider than 70mm<br>Insulation = **R2.0** to be added | ***Action Required*** (Include into Architectural Specification or Drawings) |
| **Party and Internal Corridor Walls** | Material = 200mm Tilt Up Concrete, Lined<br>Insulation = None to be added | |
| **Roof and where exposed above** | Material = Corrugated iron with solar absorptance 0.8.<br>Insulation = **R1.8** anticon to be added | ***Action Required*** (Include into Architectural Specification or Drawings) |
| **Ceiling between Apartments** | *Apartment: U2-307*<br>Material = Plasterboard<br>Insulation = **R0.5** to be added<br><br>*All others:*<br>Material = Plasterboard<br>Insulation = No insulation required | |
| **Floors between Apartments** | Material = Suspended Concrete Slab<br>Insulation = No insulation required | |
| **Floor above Carpark & Unconditioned Spaces** | Material = Suspended Concrete Slab<br>Insulation = **R2.0** to be added | ***Action Required*** (Include into Architectural Specification or Drawings) |
| **Glazing (Standard Apartments)** | *Apartments: U2-307, U2-308, U1-308*<br>Whole of Window Properties, i.e. combined glass and frame **U-Value = 5.4 W/m²K** and **Solar Heat Gain Coefficient = 0.48**<br>Typically a ***Single Glazed, Low-E Clear in Aluminium Frame (e.g. Viridian ComfortPlus Clear)***<br><br>*All others:*<br>Whole of Window Properties, i.e. combined glass and frame **U-Value = 6.7 W/m²K** and **Solar Heat Gain Coefficient = 0.70**<br>Typically a ***Single Glazed, Clear in Aluminium Frame*** | ***Action Required*** (Include into Architectural Specification or Drawings) |

***The architect is required to review and approve details contained in the tables above as changes to the building fabric will result in variation to the modelling results.***

Additionally, the following construction details were used for the energy modelling:

- Internal walls are uninsulated cavity panel.
- Draught seals present on all doors
- Floor to ceiling height as per sections and elevations.
- Floor Coverings:
  - Carpet to bedrooms
  - Tiles to bathroom
  - 80/20 carpet/ceramic to all living/kitchen areas

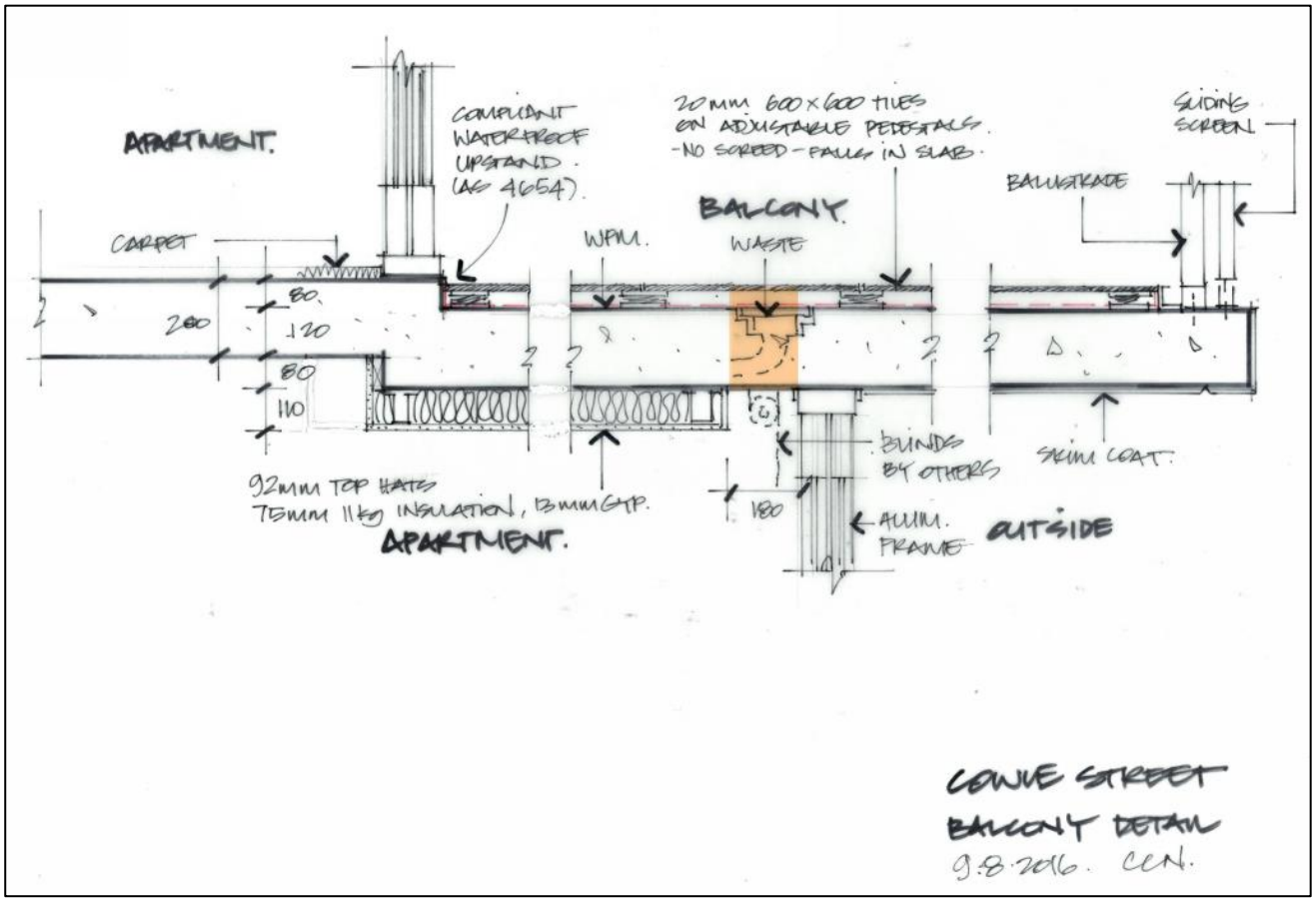
# Modelling Assumptions

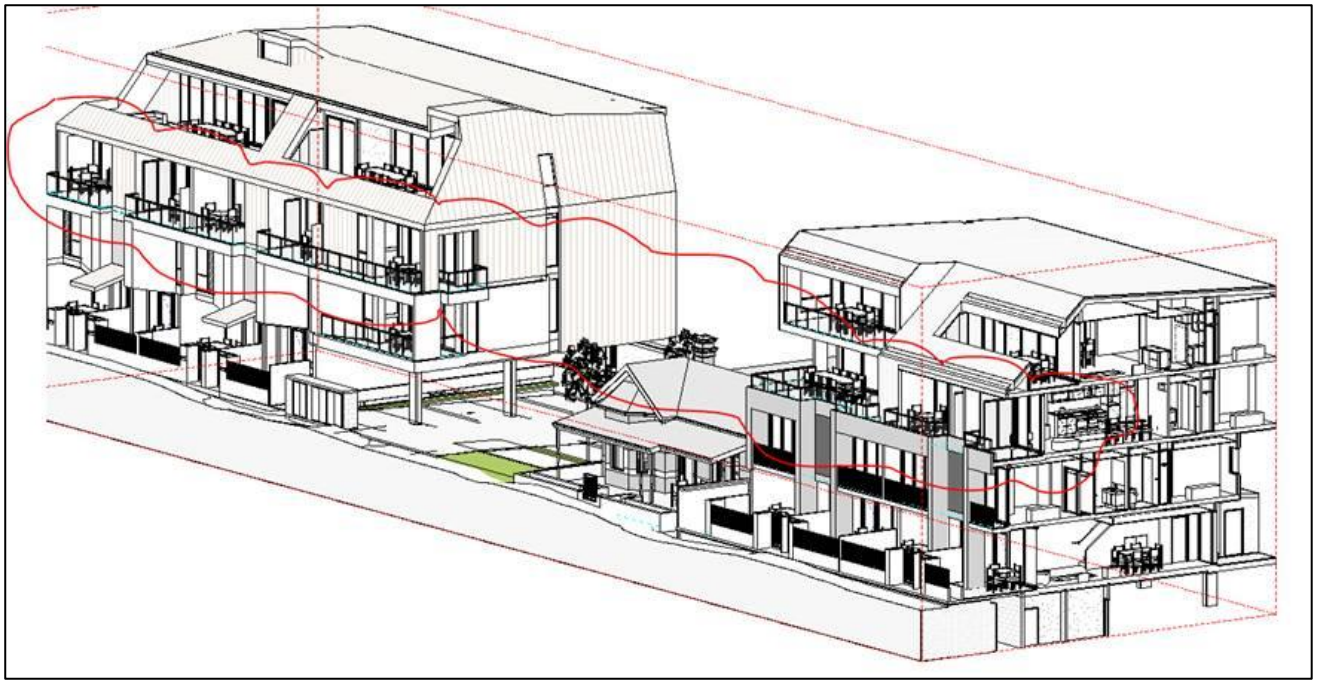
**Reduced Balcony Insulation:**

Please see mark-ups below that show a section of no insulation on a balcony for the full width of the sliding door (orange band). This reduction in insulation is required in order to keep the aluminum joinery running full height on the lower apartment.

Please see below the apartments which have been modelled with reduced insulation as per the below mark-ups:

| Apartment Type with Reduced Insulation |
|---|
| U1-210 |
| U1-208 |
| U1-209 |
| U2-208 |
| U1-207 |
| U2-209 |
| U1-211 |
| U2-207 |





## 4. Modelling Results

The table below summarises the results of the NatHERS assessments for the building.

| SITE | AVERAGE ENERGY INTENSITY (MJ/m$^2$) | AVERAGE STAR RATING | MINIMUM STAR RATING |
|---|---|---|---|
| **1** | 29.8 | 6.7 | 5.2 |
| **2** | 29.1 | 6.7 | 5.0 |

Based on the above results, the dwellings within the building meets NCC requirements where each of the dwellings achieves a NatHERS rating of not less than 5 stars and a whole development average of not less than 6 Stars.

Please refer to Appendix A Simulation Results for all modelling results.

# Appendix A – Simulation Results

**Stage 1:**

| NatHERS Star Rating for Different Glazing Types | | | | | |
|---|---|---|---|---|---|
| **Average Rating (6 Star required)** | | | **6.7** | | Compliant |
| **Minimum Rating (5 Star required)** | | | **5.2** | | |
| **Average Energy Intensity (MJ/m$^2$)** | | | **29.8** | | |
| **Window Total U-Value (W/m$^2$K)** | | | **6.7** | **5.4** | |
| **Window Total SHGC** | | | **0.70** | **0.58** | |
| **Apartment Name** | **Number of Apartments Glazing Type 1** | **Number of Apartments Glazing Type 2** | **Single Glazed Clear, Aluminium** | **Single Glazed HSG Low-E, Aluminium** | |
| | **37** | **1** | | | |
| TYPE 2AZ_G | 1 | | 6.3 | | |
| TYPE 2A_H_G | 1 | | 6.9 | | |
| TYPE 2A_G | 1 | | 6.8 | | |
| TYPE 1A_H_G | 1 | | 7.8 | | |
| TYPE 1A_G | 1 | | 7.8 | | |
| TYPE 1AZ_H_G | 1 | | 7.0 | | |
| TYPE 2G | 1 | | 6.3 | | |
| TYPE 2G_H | 1 | | 6.8 | | |
| TYPE 2DS_H | 1 | | 6.7 | | |
| TYPE 2D | 1 | | 7.5 | | |
| TYPE 2D_H | 1 | | 7.5 | | |
| TYPE 2DS | 1 | | 6.9 | | |
| TYPE 2B_F | 1 | | 7.1 | | |
| TYPE 2A_H | 1 | | 7.4 | | |
| TYPE 2A | 1 | | 7.4 | | |
| TYPE 1A_H | 1 | | 8.1 | | |
| TYPE 1A | 1 | | 8.0 | | |
| TYPE 2B_H_F | 1 | | 6.8 | | |
| TYPE 2E_G | 1 | | 6.0 | | |
| TYPE 2B_P | 1 | | 6.9 | | |
| TYPE 2A_H | 1 | | 7.4 | | |
| TYPE 2A | 1 | | 7.4 | | |
| TYPE 1A_H | 1 | | 8.1 | | |
| TYPE 1A | 1 | | 8.0 | | |
| TYPE 2B_H_P | 1 | | 6.9 | | |
| TYPE 1B_P | 1 | | 5.3 | | |
| TYPE 1A_HV_FP0 | 1 | | 7.0 | | |
| TYPE 1A_V_FP | 1 | | 7.1 | | |

# Appendix A – Simulation Results

| | | | | |
|---|---|---|---|---|
| TYPE 1A_HV_FP | 1 | | 7.2 | |
| TYPE 2E_P | 1 | | 5.4 | |
| TYPE 2AZ_R | 1 | | 5.4 | |
| TYPE 2A_H_R | 1 | | 5.3 | |
| TYPE 2A_R | 1 | | 5.3 | |
| TYPE 1A_H_R | 1 | | 5.8 | |
| TYPE 1A_R | 1 | | 5.8 | |
| TYPE 2AZ_H_R | 1 | | 5.3 | |
| TYPE 3B | 1 | | 5.2 | |
| TYPE 3C | | 1 | | 5.4 |

**Stage 2:**

| NatHERS Star Rating for Different Glazing Types | | | | |
|---|---|---|---|---|
| **Average Rating (6 Star required)** | | | **6.7** | Compliant |
| **Minimum Rating (5 Star required)** | | | **5.0** | |
| **Average Energy Intensity (MJ/m$^2$)** | | | **29.1** | |
| **Window Total U-Value (W/m$^2$K)** | | | **6.7** | **5.4** |
| **Window Total SHGC** | | | **0.70** | **0.58** |
| **Apartment Name** | **Number of Apartments Glazing Type 1** | **Number of Apartments Glazing Type 2** | **Single Glazed Clear, Aluminium** | **Single Glazed HSG Low-E, Aluminium** |
| | **34** | **2** | | |
| TYPE 1AS_H_GP | 1 | | 6.7 | |
| TYPE 2A_G | 1 | | 6.8 | |
| TYPE 1A_H_G | 1 | | 7.8 | |
| TYPE 1A_G | 1 | | 7.8 | |
| TYPE 1A_H_G | 1 | | 7.8 | |
| TYPE 1A_G | 1 | | 7.8 | |
| TYPE 1AZ_H_G | 1 | | 7.0 | |
| TYPE 3A_FR | 1 | | 6.6 | |
| TYPE 2FZ_P | 1 | | 5.7 | |
| TYPE 2F_H_P | 1 | | 6.7 | |
| TYPE 2F_P | 1 | | 7.0 | |
| TYPE 2FZ_H_P | 1 | | 6.2 | |
| TYPE 2AZ | 1 | | 6.7 | |
| TYPE 2A_H | 1 | | 7.4 | |
| TYPE 1A_H | 1 | | 8.1 | |
| TYPE 1A | 1 | | 8.0 | |
| TYPE 1A_H | 1 | | 8.1 | |
| TYPE 1A | 1 | | 8.0 | |
| TYPE 1AZ_H_P | 1 | | 6.8 | |
| TYPE 2AZ1 | 1 | | 6.1 | |

# Appendix A – Simulation Results

| | | | | |
|---|---|---|---|---|
| TYPE 2A_H | 1 | | 7.4 | |
| TYPE 1A_H | 1 | | 8.1 | |
| TYPE 1A | 1 | | 8.0 | |
| TYPE 1A_H | 1 | | 8.1 | |
| TYPE 2C | 1 | | 6.2 | |
| TYPE 3A_F | 1 | | 5.7 | |
| TYPE 1A_V_P | 1 | | 7.1 | |
| TYPE 1C | 1 | | 5.3 | |
| TYPE 2AZ0_R | 1 | | 5.1 | |
| TYPE 1A_H_R | 1 | | 5.8 | |
| TYPE 1A_R | 1 | | 5.8 | |
| TYPE 1A_H_R | 1 | | 5.8 | |
| TYPE 2A_H_R | 1 | | 5.3 | |
| TYPE 2C_R | 1 | | 5.0 | |
| TYPE 3A_R | | 1 | | 5.0 |
| TYPE 3A_H_R | | 1 | | 5.5 |

# Appendix A – Simulation Results

**Apartment Naming:**

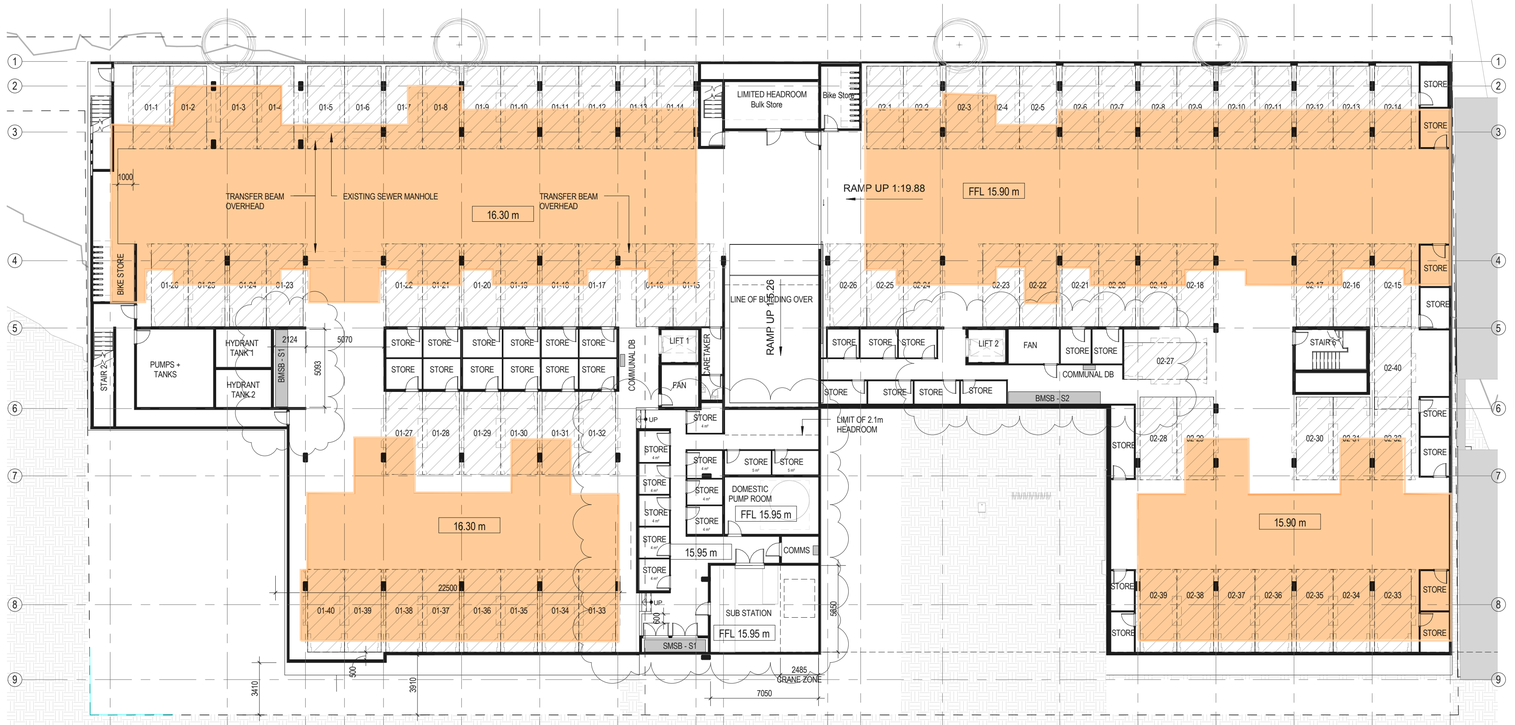
| Level | Apt No. | Apt Type |
|---|---|---|
| Ground | U1-001 | TYPE 2AZ_G |
| | U1-002 | TYPE 2A_H_G |
| | U1-003 | TYPE 2A_G |
| | U1-004 | TYPE 1A_H_G |
| | U1-005 | TYPE 1A_G |
| | U1-006 | TYPE 1AZ_H_G |
| | TH10 | TYPE 2G |
| | TH11 | TYPE 2G_H |
| | TH12 | TYPE 2DS_H |
| | TH13 | TYPE 2D |
| | TH14 | TYPE 2D_H |
| | TH15 | TYPE 2DS |
| | U2-001 | TYPE 1AS_H_GP |
| | U2-002 | TYPE 2A_G |
| | U2-003 | TYPE 1A_H_G |
| | U2-004 | TYPE 1A_G |
| | U2-005 | TYPE 1A_H_G |
| | U2-006 | TYPE 1A_G |
| | U2-007 | TYPE 1AZ_H_G |
| | U2-008 | TYPE 3A_FR |
| | TH20 | TYPE 2FZ_P |
| | TH21 | TYPE 2F_H_P |
| | TH22 | TYPE 2F_P |
| | TH23 | TYPE 2FZ_H_P |
| LEVEL 1 | U1-101 | TYPE 2B_F |
| | U1-102 | TYPE 2A_H |
| | U1-103 | TYPE 2A |
| | U1-104 | TYPE 1A_H |
| | U1-105 | TYPE 1A |
| | U1-106 | TYPE 2B_H_F |
| | TH16M | TYPE 2E_G |
| | U2-101 | TYPE 2AZ |
| | U2-102 | TYPE 2A_H |
| | U2-103 | TYPE 1A_H |
| | U2-104 | TYPE 1A |
| | U2-105 | TYPE 1A_H |
| | U2-106 | TYPE 1A |
| | U2-107 | TYPE 1AZ_H_P |
| LEVEL 2 | U1-201 | TYPE 2B_P |
| | U1-202 | TYPE 2A_H |
| | U1-203 | TYPE 2A |
| | U1-204 | TYPE 1A_H |
| | U1-205 | TYPE 1A |
| | U1-206 | TYPE 2B_H_P |
| | U1-207 | TYPE 1B_P |
| | U1-208 | TYPE 1A_HV_FP0 |
| | U1-209 | TYPE 1A_V_FP |
| | U1-210 | TYPE 1A_HV_FP |

# Appendix A – Simulation Results

| | | |
|---|---|---|
| | U1-211 | TYPE 2E_P |
| | U2-201 | TYPE 2AZ1 |
| | U2-202 | TYPE 2A_H |
| | U2-203 | TYPE 1A_H |
| | U2-204 | TYPE 1A |
| | U2-205 | TYPE 1A_H |
| | U2-206 | TYPE 2C |
| | U2-207 | TYPE 3A_F |
| | U2-208 | TYPE 1A_V_P |
| | U2-209 | TYPE 1C |
| LEVEL 3 | U1-301 | TYPE 2AZ_R |
| | U1-302 | TYPE 2A_H_R |
| | U1-303 | TYPE 2A_R |
| | U1-304 | TYPE 1A_H_R |
| | U1-305 | TYPE 1A_R |
| | U1-306 | TYPE 2AZ_H_R |
| | U1-307 | TYPE 3B |
| | U1-308 | TYPE 3C |
| | U2-301 | TYPE 2AZ0_R |
| | U2-302 | TYPE 1A_H_R |
| | U2-303 | TYPE 1A_R |
| | U2-304 | TYPE 1A_H_R |
| | U2-305 | TYPE 2A_H_R |
| | U2-306 | TYPE 2C_R |
| | U2-307 | TYPE 3A_R |
| | U2-308 | TYPE 3A_H_R |

# Appendix B - Insulation Mark-ups

NOTES:
DO NOT SCALE FROM DRAWINGS VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK.


**1** 415 **OVERALL SITE LAYOUT - BASEMENT LEVEL**
*1 : 200*


**2** 415 **OVERALL SITE LAYOUT - GROUND LEVEL**
*1 : 200*

## Key

- Minimum Added Insulation R1.8 to Roof
- Minimum Added Insulation R2.0 to Exposed Floor
- Minimum Added External wall Insulation R2.0

| Date | No. | Revision Description | Drawn |
|---|---|---|---|
| 28/04/16 | D | CO-ORDINATION ISSUE 04 | |
| 21/04/16 | C | CO-ORDINATION ISSUE 03 | |
| 14/04/16 | B | CO-ORDINATION ISSUE 02 | |
| 23/03/16 | A | CO-ORDINATION ISSUE 01 | |

KEY PLAN

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PROJECT
COWLE STREET

48-70 Cowle Street West Perth WA

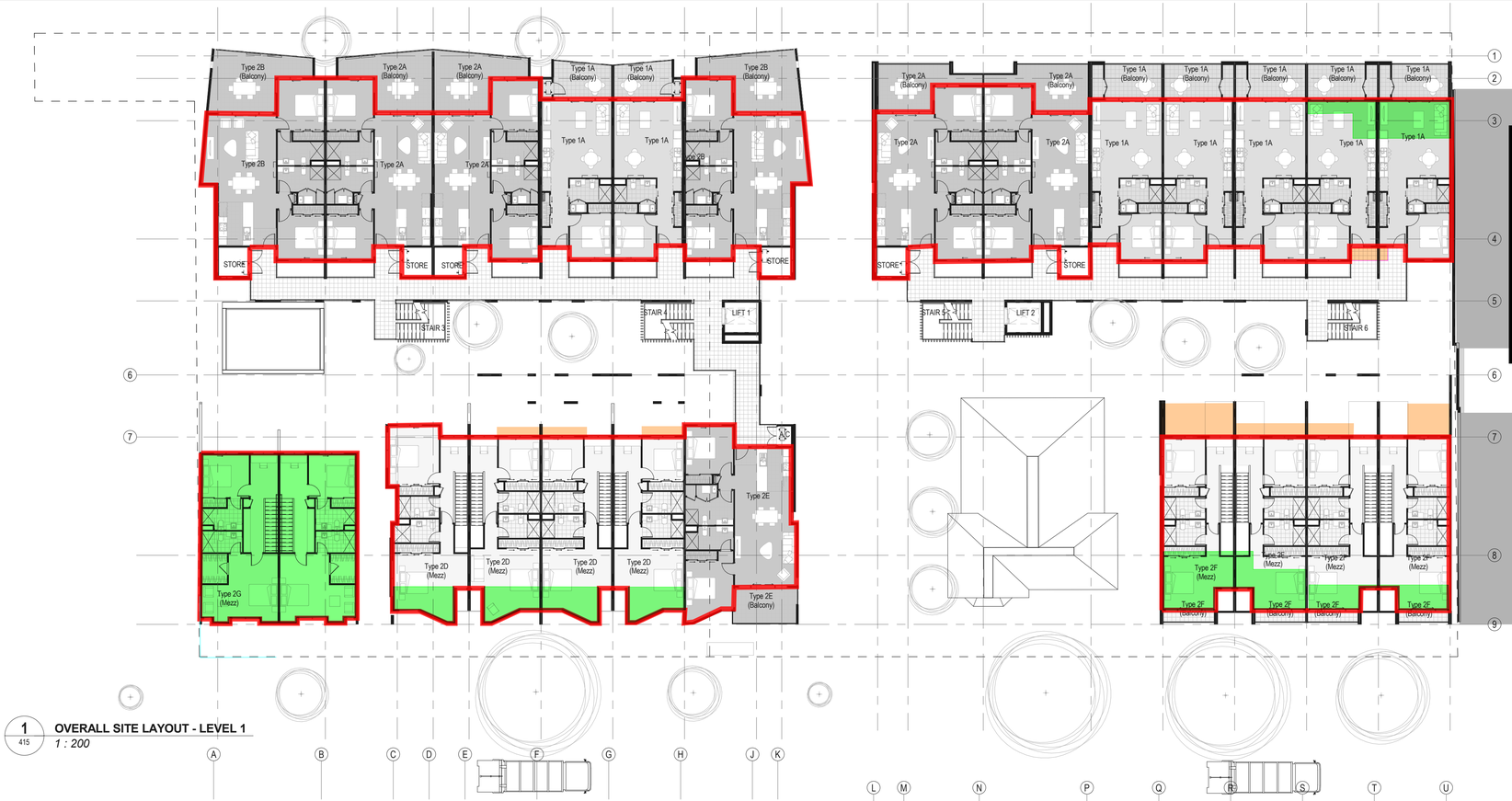
TITLE
OVERALL SITE LAYOUT - BASEMENT & GROUND LEVELS

**CO-ORDINATION ISSUE**
NOT FOR CONSTRUCTION

DATE DRAWN: PLOT DATE: *28/04/2016 7:17:52 AM*
DRAWN: **Author** CHECKED: **Checker** APPROVED: **Approver**
SCALE 1:200 (A3) 1 : 200 (A1)

| PROJ N° | STAGE | ZONE | DISC./ DWG N° | REV |
|---|---|---|---|---|
| | | | **A01.05** | **D** |

NOTES:
DO NOT SCALE FROM DRAWINGS VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK.


1 / 415 **OVERALL SITE LAYOUT - LEVEL 1**
*1 : 200*


2 / 415 **OVERALL SITE LAYOUT - LEVEL 2**
*1 : 200*

## Key

- Minimum Added Insulation R1.8 to Roof
- Minimum Added Insulation R2.0 to Exposed Floor
- Minimum Added External wall Insulation R2.0

| Date | No. | Revision Description | Drawn |
|---|---|---|---|
| 28/04/16 | D | CO-ORDINATION ISSUE 04 | |
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| 23/03/16 | A | CO-ORDINATION ISSUE 01 | |

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PROJECT
COWLE STREET

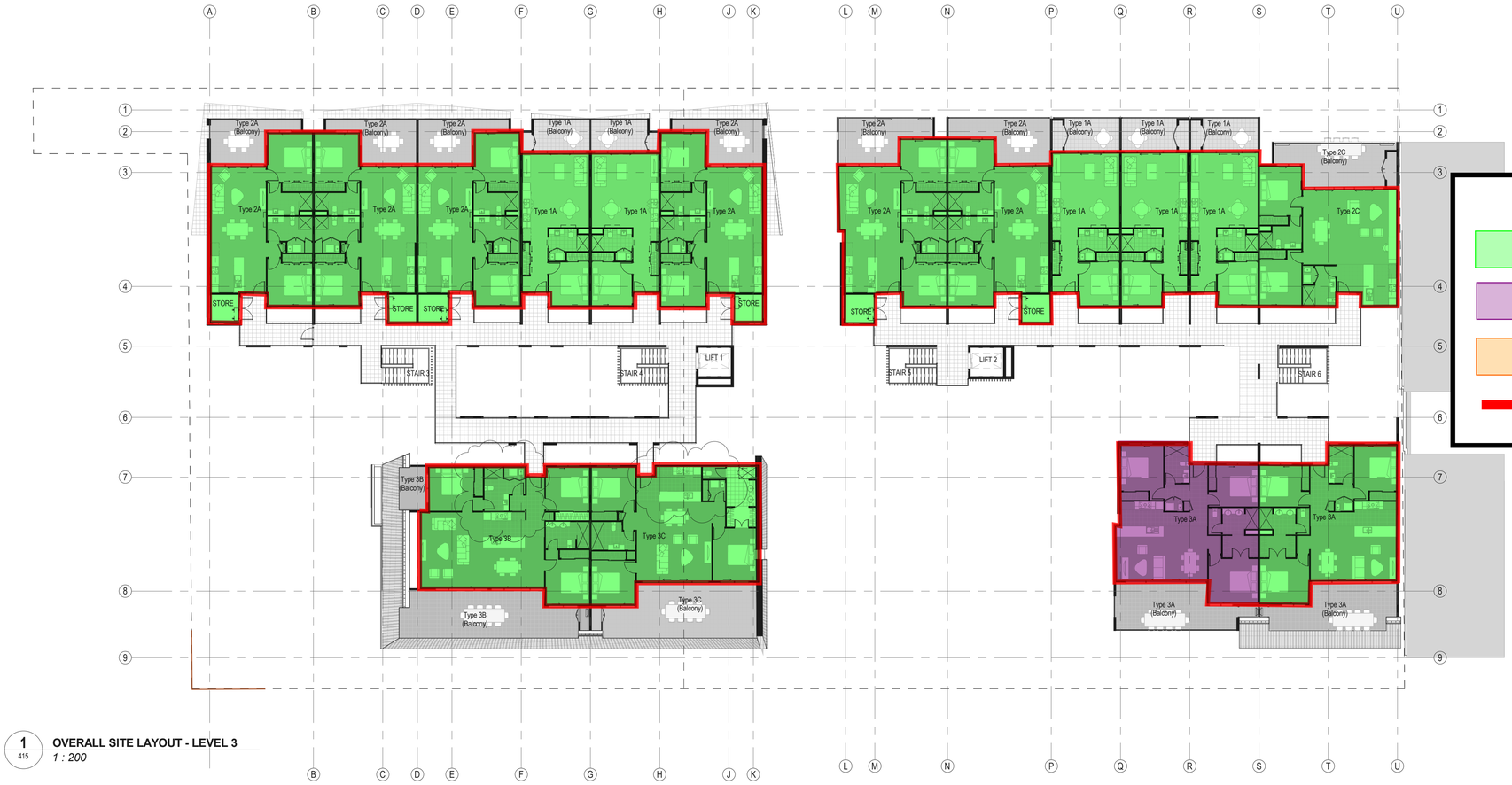
48-70 Cowle Street West Perth WA

TITLE
OVERALL SITE LAYOUT - LEVELS 1 & 2

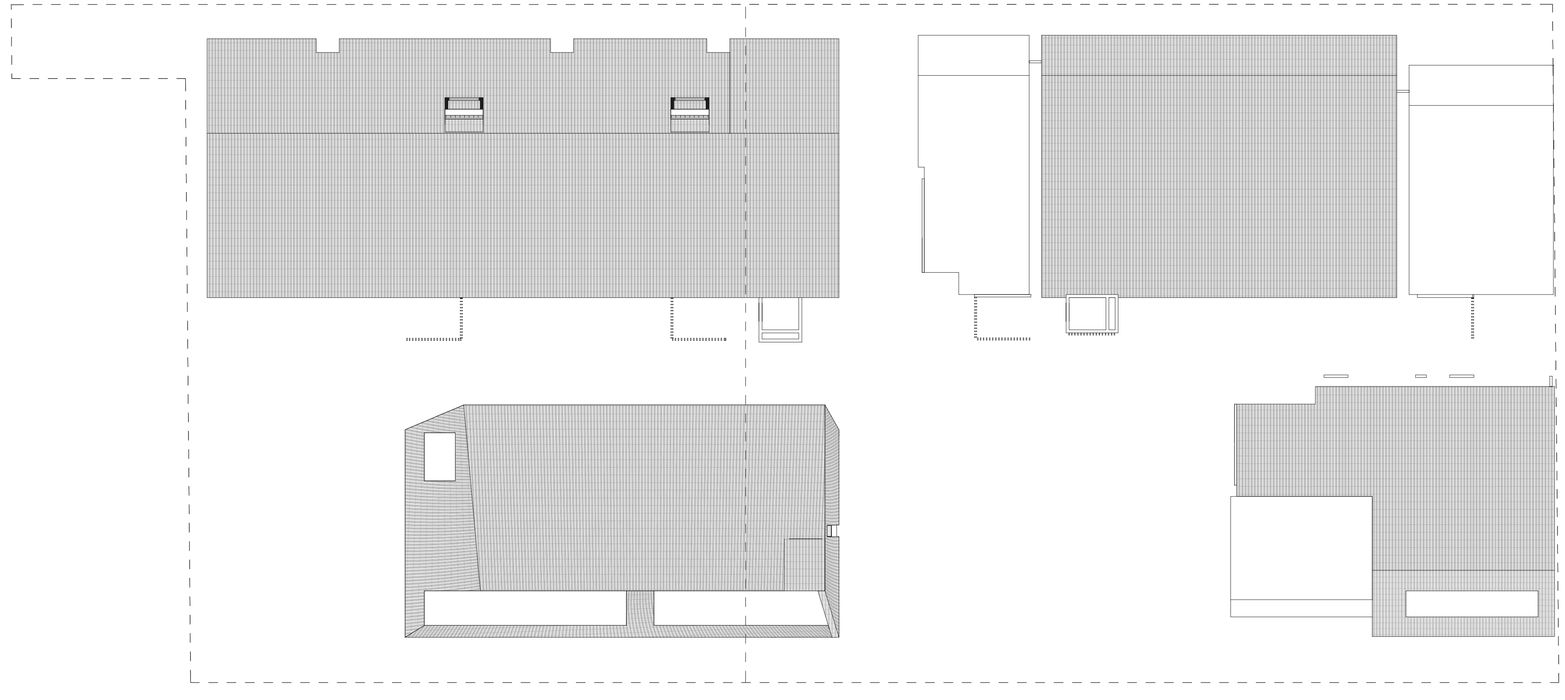
**CO-ORDINATION ISSUE**
NOT FOR CONSTRUCTION

DATE DRAWN: PLOT DATE: *28/04/2016 7:18:31 AM*
DRAWN: **Author** CHECKED: **Checker** APPROVED: **Approver**
SCALE 1:200 (A3) 1 : 200 (A1)

| PROJ N° | STAGE | ZONE | DISC./ DWG N° | REV |
|---|---|---|---|---|
| | | | **A01.06** | **D** |




1 / 415 **OVERALL SITE LAYOUT - LEVEL 3**
*1 : 200*



2 / 415 **OVERALL SITE LAYOUT - ROOF LEVEL**
*1 : 200*

NOTES:
DO NOT SCALE FROM DRAWINGS VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK.


## Key

- Minimum Added Insulation R1.8 to Roof
- Minimum Added Insulation R1.8 to Roof + R0.5 Added Insulation to Ceiling
- Minimum Added Insulation R2.0 to Exposed Floor
- Minimum Added External wall Insulation R2.0

| Date | No. | Revision Description | Drawn |
|---|---|---|---|
| 28/04/16 | D | CO-ORDINATION ISSUE 04 | |
| 21/04/16 | C | CO-ORDINATION ISSUE 03 | |
| 14/04/16 | B | CO-ORDINATION ISSUE 02 | |
| 23/03/16 | A | CO-ORDINATION ISSUE 01 | |

KEY PLAN

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PROJECT
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TITLE
OVERALL SITE LAYOUT - LEVEL 3 & ROOF

**CO-ORDINATION ISSUE**
NOT FOR CONSTRUCTION

DATE DRAWN: PLOT DATE: *28/04/2016 7:18:52 AM*
DRAWN: **Author** CHECKED: **Checker** APPROVED: **Approver**
SCALE 1:200 (A3) 1 : 200 (A1)
1 2 3 4 5 6 m

| PROJ N° | STAGE | ZONE | DISC / DWG N° | REV |
|---|---|---|---|---|
| | | | **A01.07** | **D** |

# Appendix C - Prescriptive Requirements

The following specifications will need to be included on the architectural drawings and/or specification.

### Thermal construction general

(a) Where required, insulation must comply with AS/NZS 4859.1 and be installed so that it –
  (i) Abuts or overlaps adjoining insulation other than at supporting members such as studs, noggings, joists, furring channels and the like where the insulation must butt against the member; and
  (ii) Forms a continuous barrier with ceilings, walls, bulkheads, floors or the like that inherently contribute to the thermal barrier; and
  (iii) Does not affect the safe or effective operation of a service or fitting.

(b) Where required, reflective insulation must be installed with –
  (iv) The necessary airspace to achieve the required R-value between a reflective side of the reflective insulation and a building lining or cladding; and
  (v) The reflective insulation closely fitted against any penetration, door or window opening; and
  (vi) The reflective insulation adequately supported by framing members; and
  (vii) Each adjoining sheet of roll membrane being –
    (A) Overlapped not less than 50mm; or
    (B) Taped together

(c) Where required, bulk insulation must be installed so that –
  (viii) It maintains its position and thickness, other than where it crosses roof battens, water pipes, electrical cabling or the like; and
  (ix) In a ceiling, where there is no bulk insulation or reflective insulation in the wall beneath, it overlaps the wall by not less than 50mm

(d) Roof, ceiling, wall and floor materials, and associated surfaces are deemed to have the thermal properties listed in **Specification J1.2**

### Roof and Ceiling Construction

(a) Where, for operational or safety reasons associated with exhaust fans, flues or recessed downlights, the area of required ceiling insulation is reduced, the loss of insulation must be compensated for by increasing the R-Value of the insulation in the remainder of the ceiling in accordance with Table J1.3b.

# Appendix C - Prescriptive Requirements

**Table J1.3b Adjustment of minimum R-value for loss of ceiling insulation**

| **Percentage of ceiling area uninsulated** | **Minimum *R-Value* of ceiling insulation *required* to satisfy J1.3(a)** | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **2.5** | **3.0** | **3.5** | **4.0** | **4.5** | **5.0** | **5.5** | **6.0** |
| | **Adjusted minimum *R-Value* of ceiling insulation *required* to compensate for loss of ceiling area insulation** | | | | | | | |
| 0.5% to less than 1.0% | 2.8 | 3.4 | 4.0 | 4.7 | 5.4 | 6.2 | 6.9 | |
| 1.0% to less than 1.5% | 2.9 | 3.6 | 4.4 | 5.2 | 6.1 | 7.0 | | |
| 1.5% to less than 2.0% | 3.1 | 3.9 | 4.8 | 5.8 | 6.8 | | | |
| 2.0% to less than 2.5% | 3.3 | 4.2 | 5.3 | 6.5 | | | | |
| 2.5% to less than 3.0% | 3.6 | 4.6 | 5.9 | | | | | |
| 3.0% to less than 4.0% | 4.2 | 5.7 | Not Permitted | | | | | |
| 4.0% to less than 5.0% | 5.0 | | | | | | | |
| 5.0% or more | | | | | | | | |
| **Note:** Where the minimum *R-Value* of ceiling insulation *required* to satisfy J1.3() is between the values stated, interpolation may be used to determine the adjusted minimum *R-Vale*. | | | | | | | | |

(a) A roof that—

(i) is required to achieve a minimum Total R-Value; and

(ii) (has metal sheet roofing fixed to metal purlins, metal rafters or metal battens; and

(iii) does not have a ceiling lining or has a ceiling lining fixed directly to those metal purlins, metal rafters or metal battens (see Specification J1.3 Figure 2(c) and (f)),

must have a thermal break, consisting of a material with an R-Value of not less than R0.2, installed between the metal sheet roofing and its supporting metal purlins, metal rafters or metal battens.

# Appendix D - Building Sealing

### Chimneys and flues

The chimney or flue of an open solid-fuel burning appliance must be provided with a damper or flap that can be closed to seal the chimney or flue.

### Roof lights

(a) A roof light must be sealed, or capable of being sealed when serving—
  (i) a conditioned space; or
  (ii) a habitable room in climate zones 4, 6, 7 and 8.

(b) A roof light required by (a) must be constructed with—
  (i) an imperforate ceiling diffuser or the like installed at the ceiling or internal lining level; or
  (ii) a weatherproof seal if it is a roof window; or
  (iii) a shutter system readily operated either manually, mechanically or electronically by the occupant.

### External windows and doors

(a) A seal to restrict air infiltration must be fitted to each edge of a door, openable window or the like forming part of—
  (i) the envelope of a conditioned space; or
  (ii) the external fabric of a habitable room or public area in climate zones 4, 5, 6, 7 and 8.

(b) The requirements of (a) do not apply to—
  (i) a window complying with AS 2047; or
  (ii) a fire door or smoke door; or
  (iii) a roller shutter door, roller shutter grille or other security door or device installed only for out-of-hours security.

(c) A seal required by (a)—
  (i) for the bottom edge of an external swing door, must be a draft protection device; and
  (ii) for the other edges of an external door or the edges of an openable window or other such opening, may be a foam or rubber compression strip, fibrous seal or the like.

(d) An entrance to a building, if leading to a conditioned space must have an airlock, self-closing door, revolving door or the like, other than—
  (i) where the conditioned space has a floor area of not more than 50 m2; or
  (ii) where a cafe, restaurant, open front shop or the like has—
    (A) A 3 m deep un-conditioned zone between the main entrance, including an open front, and the conditioned space; and
    (B) At all other entrances to the cafe, restaurant, open front shop or the like, self-closing doors.

### Exhaust fans

A miscellaneous exhaust fan, such as a bathroom or domestic kitchen exhaust fan, must be fitted with a sealing device such as a self-closing damper or the like when serving –

(a) a conditioned space; or

(b) a habitable room in climate zones 4, 5, 6, 7 and 8.

### Construction of roofs, walls and floors

(a) Roofs, ceilings, walls, floors and any opening such as a window frame, door frame, roof light frame or the like must be constructed to minimise air leakage in accordance with (b) when forming part of—
  (i) the envelope; or

# Appendix D - Building Sealing

(ii) the external fabric of a habitable room or a public area in climate zones 4, 6, 7 and 8.

(b) Construction required by (a) must be—

(i) enclosed by internal lining systems that are close fitting at ceiling, wall and floor junctions; or

(ii) sealed by caulking, skirting, architraves, cornices or the like.

(c) The requirements of (a) do not apply to openings, grilles and the like required for smoke hazard management.

### Evaporative coolers

An evaporative cooler must be fitted with a self-closing damper or the like when serving -

(a) a heated space; or

(b) a habitable room in climate zones 4, 5, 6, 7 and 8.